

WHAT IS CLAIMED IS:

1. A method for manufacturing closures for evacuated fluid collection tubes, said method comprising the steps of:

providing a sheet of sealing material;

moving said sheet to a molding apparatus;

molding elastomeric stoppers onto said sheet at spaced apart locations thereon; and

cutting said sheet into selected shapes surrounding portions of each said stopper on said sheet, such that each said stopper has a seal of said sealing material projecting outwardly from said stopper for defining one of said closures.

2. The method of claim 1, wherein portions of each said stopper adjacent said sheet are substantially cylindrical, said step of cutting said sheet comprising cutting circular sections from said sheet, each said circular section being substantially concentric with said respective stopper and defining a diameter greater than a diameter defined by said stopper.

3. The method of claim 1, wherein said sheet is an elongate strip initially wound on a roll, said strip being incrementally withdrawn from said roll for movement to said mold apparatus.

4. The method of claim 3, further comprising the step of winding said strip of sealing material and said stoppers thereon onto a take up roll prior to said cutting step.

5. The method of claim 1, wherein said sheet of seal material is a laminated sheet having a first outer layer formed from a thermoplastic material, an intermediate layer of metal foil adjacent said first outer layer, and a second outer layer, said stopper being molded on the second outer layer.

6. The method of claim 5, wherein said second outer layer is polyethylene terephthalate.

7. The method of claim 1, further comprising the step of providing a plurality of outer caps, each said outer cap having a cylindrical skirt with top and bottom ends, an annular shoulder extending inwardly from said top end of said skirt and an aperture formed centrally in said annular shoulder, said annular shoulder having a bottom surface facing toward said bottom end of said skirt, said method further comprising adhering said seal to said bottom surface of said annular shoulder such that said stopper is disposed within and spaced from said skirt.

8. The method of claim 7, wherein said cap further comprises a safety collar substantially adjacent said aperture in said annular shoulder and projecting from said annular shoulder in a direction opposite from said skirt, said method further comprising providing a top stopper dimensioned for slidable insertion into said safety collar of said cap, bonding said top stopper to a surface of said seal opposite said stopper such that said top stopper enters said safety collar when said seal is adhered to said bottom surface of said annular shoulder.

9. A method for sealing an open end of a fluid collection tube, said method comprising:

providing a rigid cap having an annular shoulder with opposite top and bottom surfaces and an opening extending therethrough, a skirt projecting down from said bottom surface of said shoulder and surrounding said opening, said skirt being dimensioned for telescoping over said open end of said fluid collection tube;

providing a seal dimensioned for placement across said open top of said tube, said seal having opposite first and second surfaces;

bonding an elastomeric stopper to said second surface of said seal, said stopper being dimensioned for sealed engagement in said open top of said tube;

bonding said first surface of said seal to said bottom surface of said annular shoulder of said cap such that said stopper is concentrically disposed within said skirt;

inserting said elastomeric stopper into said open end of said tube such that said skirt of said cap surrounds said open end of said tube; and

bonding said second surface of said seal to said open end of said tube for sealing said tube.

10. The method of claim 9, wherein said step of bonding said second surface of said seal to said open end of said tube comprises peelably bonding said seal to said open end of said tube such that a weaker bond is provided between said seal and said tube than between said seal and said cap.

11. The method of claim 10, wherein said step of bonding said elastomeric stopper to said second surface of said seal comprises molding said elastomeric stopper on said seal.

12. The method of claim 9, wherein said step of providing said seal comprises providing said seal with surface dimensions substantially larger than said open end of said tube, said method further comprising cutting said seal to fit within said skirt and over said open end of said tube.

13. The method of claim 12, wherein said step of bonding said stopper to said seal comprises molding said stopper directly onto said seal.

14. The method of claim 9, wherein said step of providing a cap comprises providing a cap having an annular collar concentric with said opening in said annular shoulder and projecting from said top surface of said shoulder, said method further comprising the step of securing a second stopper in said collar and adjacent said first surface of said seal.

15. The method of claim 9, wherein the step of providing a seal comprises providing a seal having a first outer layer formed from a thermoplastic material and having said first surface thereon, a second layer formed from a polyethylene terephthalate and having said second surface thereon, and an aluminum foil layer disposed between said first and second layers.

16. The method of claim 9, wherein the step of providing a seal comprises providing a seal with a first layer having said first surface thereon and formed from the same material as said cap, a second layer having said second surface thereon and formed from the same material as said tube and an aluminum foil layer between said first and second layers.

17. The method of claim 9, further comprising the step of evacuating said tube before inserting said elastomeric stopper into said tube.